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Manifestations of the Old Copper Industry in Ontario

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Perhaps one of the most puzzling archaeological problems of the upper Great Lakes region of North America is posed by the presence of a highly distinctive copper industry which apparently thrived in late Archaic and early Woodland times. Actually, the production of artifacts from native copper in the Great Lakes area covers a much greater period of time. For example, copper artifacts are reported from Laurentian sites in New York,[2] from early and late ceramic horizons in Wisconsin,[3] and apparently were still being fabricated in early contact times.[4] However, that aspect of prehistoric copper working known as the "Old Copper" industry represents a distinctive complex characterized by the predominance of utilitarian traditions and the presence of such unique types as the rat-tail and socket tang projectile point.

The occurrence of Archaic prototypes in both copper and stone for some of the Old Copper forms,[5] the evident contemporaneity of Old Copper with early Woodland at the Osceola Site in Wisconsin,[6] and the fact that the most characteristic features of the complex are absent from middle Woodland times and on, indicate the chronological position of the Old Copper industry. Thus, there is general agreement that it began in late Archaic and persisted into early Woodland times.[7] Since the Frontenac Island Archaic horizon was dated at 4930+260 years, and the earliest C 14 date of a Woodland deposit, that of the Oberlander 2 component in New York, was 2948+170 years,[8] we may suggest the period from 1500 to 500 B.C. for Old Copper. However, the result of a C 14 analysis of charcoal obtained from the Oconto site in Wisconsin, which is pending, may be expected to provide a more definite answer to the questions of age.[9].

The problems of the origin and cultural affiliations of the Old Copper industry, on the other hand, are still largely unsolved. Norse, west Asiatic and old Athabaskan metal artifacts have been suggested as sources of the Old Copper types,[10] and stone and bone prototypes have been sought in Dorset Eskimo material,[11] as well as in northeastern Archaic cultures, as previously mentioned. However, so far as the most

1. The authors wish to express their indebtedness to a number of persons who have contributed to this study, namely, Mr. Jack Mangan and Miss Barbara Shaw, who discovered the Farquar Lake cache and kindly put their surface collection at our disposal; Dr. and Mrs. A. E. Shaw for their generous hospitality and many kindnesses during our visit to the site; Mr. K. E. Kidd, Curator of Ethnology in the Royal Ontario Museum, for making the copper collection available to us for study; Mr. J. S. Gooding, Assistant Preparator of the Museum, who was associated with us in the excavation of the Farquar Lake material and facilitated the study in various ways; Dr. E. S. Carpenter of the Department of Anthropology, University of Toronto, for a critical reading of the manuscript.
2. Ritchie 1944.
3. Ritzenthaler 1946.
4. West 1929.
5. McKern 1942; Ritchie 1946; Miles 1951.
6. Ritzenthaler 1946.
7. McKean 1942; Griffin 1946; Ritchie 1946; Ritzenthaler 1946; Quimby 1952.
8. Johnson 1951, samples 191 and 192. Analysis of charcoal from a recently excavated Point Peninsula site on the Indian River in northern New York evidently yielded an earlier date than that of Oberlander 2. However, the figure has not yet been reported (W. A. Ritchie. The Teocentli, No. 55, pp. 21-22, June 1953).
9. Ritzenthaler and Wittry 1952.
10. See summary in Miles 1951.
11. Martin et al 1947; Quimby 1952.

diagnostic types, particularly the rat-tail tang and socketed projectile points, are concerned, no satisfactory prototypes have been demonstrated to date. This may be due in part to an over-emphasis upon a taxonomic approach to the problem and, hence, a general reluctance to regard these forms as indigenous developments consequent upon experimentation with a new material having properties different from those of stone or bone. For example, Martin, Quimby and Collier[12] state that "It seems inconceivable that the forms of copper tools and weapons could have been derived only from work in copper. Instead, the copper tools and weapons were probably copies of similar objects made of stone and bone." Perhaps this view reflects the persistence of an attitude, which, as Goldenweiser has remarked,[13] was once more common when it was assumed that "the primitive individual was literally submerged, that no room was left for personality or self-expression in a society ridden by tradition, dominated by established habits and dogmas, shot through with inflexible patterns." This scholar pointed out that, while individual variation may, indeed, be more restricted among primitive peoples in such areas of life as the religious, there is "the wide range of activities which, in their very nature, are individual, such as hunting and fishing . . . the technical aspects of craft and art . . . in these domains the relative objectivity of outlook forced upon the mind by the concreteness of experience and the strictly pragmatic nature of objectives, paves the way for dispassionate observation, accumulation of valid knowledge, and invention."

It is not our intention to suggest that a search for prototypes is useless. Indeed, prototypes for some of the earlier forms of copper tools are certainly to be expected as a result of the initial transfer of traditions in stone working, and perhaps bone, to the new medium. However, it would also seem possible to view the Old Copper industry as a period of cultural experimentation and regional specialization involving the development of certain features, such as the rat-tail or socket tang, to which a malleable material like copper is peculiarly well suited. For features such as these, no prototypes need be expected other than in forms within the industry itself. This point of view cannot be pursued further in the present context but it would appear to deserve some consideration in future researches concerned with Old Copper manifestations.

The primary center of this ancient industry seems to have been in Wisconsin,[14] whence it spread and achieved a high development in Minnesota[15] and upper Michigan. These constitute three of the four areas adjacent to the principal sources of native copper on Isle Royale and Keweenaw Peninsula.[16] The varieties and distribution of Old Copper artifacts in Ontario, which is the fourth contiguous area, at least in its northwestern reaches, have received little attention in the literature.[17] It is hoped that the present report will help to fill this gap and throw further light on the nature and extent of the Old Copper industry in general.

The material upon which the study was based comprised a sample of prehistoric copper artifacts from various parts of Ontario in the Royal Ontario Museum collection, and an Old Copper cache recently excavated by the authors on the shore of Farquar Lake, Ontario. This cache is the first to have been discovered in the Province and one of the very few to have been re-

12. 1947, p. 302.
13. 1936, pp. 99-100.
14. McKern 1942; Wittry 1951.
15. Flaskerd 1940.
16. West 1929.
17. Wintemberg 1929.

ported anywhere. Many thousands of copper artifacts have been found in Wisconsin and surrounding territories, but the majority were isolated finds. Only two Old Copper sites have been excavated[18] and possibly a dozen cache finds are known.[19] The importance of a cache lies chiefly in the fact that it enables a number of different types of artifacts to be classed together in space and time. In other words, it provides direct evidence of a cultural cohesion which would necessarily remain presumptive if only collections of isolated artifacts were available. A description of the Farquar Lake cache has been provided first. This is followed by an analysis of the general Ontario sample which will serve, among other things, to place the cache material in a broader context.

THE FARQUAR LAKE CACHE

The Farquar Lake cache, comprising a number of copper artifacts and chalcedony flake tools, was located on the western shore of a small bay forming the southwestern extremity of Farquar Lake, approximately in the east-central portion of Lot 4, Concession 1 of Harcourt Township in Haliburton County. Farquar Lake is situated roughly in the center of the eastern half of southern Ontario (Fig. 1) and is just north of the southern terminus of the Laurentian Shield. Like most of the many small lakes in the area, it is irregular in shape and dominated by rugged cliffs of Laurentian rock.

Artifacts were recovered from a small beach formed by a flat rock which projects slightly into the bay and was covered by a thin layer of sand and gravel varying in depth from an inch or two near the water's edge to more than a foot at the upper end. The upper or western end of the beach which sloped in a regular fashion toward the lake (as indicated by the approximate elevations given in Fig. 2) was about 7 feet above lake level on the occasion of our visit during the late summer of 1952. Since Farquar Lake is employed as a reservoir for the Trent Waterway to the south, the Burnt River, which is its only outlet, has been dammed. This creates a difference of 7 feet in water level which achieves its lowest point by the end of August. At high water level the site is entirely submerged, about 2 feet of water covering the area in which most of the artifacts were found (Fig. 2). However, because the lake is small and protected by its high rocky shoreline, it seemed unlikely that sufficient turbulence to have seriously disturbed the cache could have occurred. On the other hand, it is known that the beach had been raked a number of times and it seems probable that this was responsible for the movement of a relatively few items from their original resting place. The distribution of artifacts (Fig. 2) clearly indicated that the majority were concentrated in an area not more than 5 feet square; all were found within an inch or two of the surface. The center of concentration was about 9 feet from the west end of the beach and about 28 feet from the water's edge. One half of a chalcedony scraper was recovered in the area of highest concentration and the other half was found 8 feet to the east. This supports the hypothesis that all the artifacts were originally concentrated in a single cache but that there had been a certain amount of disturbance, probably through raking. Most of the larger copper artifacts, including an adze and several perforating tools, had been removed as a surface collection prior to our arrival. However, enquiry suggested that most of these were also found in or near the area of primary concentration.

Beyond the artifacts themselves, no defi-

18. Ritzenthaler 1946; Ritzenthaler and Wittry 1952.
19. Wittry 1951.

nite archeological features were discovered. No evidence of house structures, hearths or food refuse was found. An ambiguous red and grey patch was uncovered near the main body of the cache (Fig. 2) and a number of others, lacking clear definition, appeared elsewhere on the beach. However, similar patches varying from a rust color to the bright red of hematite occurred in sandy areas elsewhere about the lake. All of these were more likely due to the natural occurrence of iron in the soil than to the activity of man; the area abounds in small outcroppings of various minerals among which iron is especially common. The presence of charcoal and orange soil discoloration on either side of the southwestern extremity of the rock which marks the northern limit of the tiny beach (Fig. 2) indicated that fires had occurred there, but there was no evidence of their association with the copper artifacts. A forest fire in the area about 60 years ago or fires built by cottagers may have been responsible for these.

Three circumstances, in particular, led us to believe that almost all of the artifacts originally present on the beach have been recovered: the location of the cache was apparently known only to its two discoverers prior to our visit; it was submerged through the spring and most of the summer and therefore protected from chance collectors who might otherwise have discovered it; and finally, nearly the entire beach area adjacent to the cache was excavated. The collection comprised: 21 chipped stone items, including 15 scrapers, 1 possible projectile point and 5 indeterminate flakes; and 98 copper items, including 14 projectile points, 26 perforating tools, 5 knives, 1 adze, 1 wedge, 5 beads and 46 indeterminate fragments.

The stone artifacts of chalcedony (or jasper) varied from light to dark brown in color and, where thin, were translucent. Artifacts of this material are much less common in Ontario than are those of the grey or blue varieties of flint. There were two crescentic side scrapers, both of which appeared to have been struck off a prepared core. In one specimen (Fig. 3:2) preparation had involved the removal of 3 longitudinal flakes, two of which were mere slivers extending about a quarter of the blade length; the third extended the entire length and formed the cutting edge. The cutting edge of the second specimen had been produced by removal of oblique lateral flakes. In both cases the cutting edge had been retouched and nodule patination was adhering to the opposite edge which had not been modified. A third crescentic scraper had no patination and almost complete retouching of both edges. Four double or bilateral side scrapers occurred. These were concavo-convex, viewed edgewise, but trianguloid rather than crescentic when viewed face on. Both of the long edges had been retouched (Fig. 3:3-4). Two end scrapers with a bevel and secondary chipping at one end, were found. The opposite end was left thick to provide a finger grip (Fig. 3:5,7). A single parrot-beak shaped scraper occurred (Fig. 3:6). Three rectanguloid scrapers were recovered, including one large, roughly worked example reminiscent of a Levallois flake tool (Fig. 3:1). The two others were smaller and more carefully fashioned (Fig. 3:8); all four edges had been retouched in each case, though nowhere producing a very satisfactory cutting edge. Two leaf-shaped scrapers were found. One of these (Fig. 3:9) had been broken cleanly near the mid-line and also at right angles to this break across the artifact. This implement had been carefully worked on both faces, and at least two edges exhibited fine secondary retouching. In its original form, it may have closely resembled a leaf-shaped scraper found by

Ritzenthaler and Wittry at Oconto in Wisconsin.[20]

A single possible projectile point, similar to those often referred to as "bird points," largely because of their very small size, was recovered (Fig. 3:10). The sharp triangular notch in the base of this artifact appeared to have been produced by a single blow and, therefore, may have been accidental. Since it was primarily this notch which gave the artifact the appearance of a projectile point, it could not be defined as such with certainty.

Stone tools have been found in definite association with Old Copper artifacts at only two other sites, Osceola[21] and Oconto,[22] both of which are in Wisconsin. Ritzenthaler's contention, on the basis of the Osceola evidence, that a stone complex was a part of the Old Copper manifestation, was criticized by Miles[23] on the grounds that there had been no justification for the separation of the stone artifacts from the intrusive Woodland pottery at Osceola. However, the occurrence of stone and copper artifacts in the absence of pottery at Oconto, and now at Farquar Lake, seems to establish the association beyond doubt.

The 52 copper artifacts recovered from the Farquar Lake beach were generally in a good state of preservation. Patination and erosion were most in evidence in the case of the longer perforating tools, but in no instance were any significant details of an artifact obscured through the effects of these processes. As has been commonly observed in Old Copper collections, utilitarian items predominated with but 5 beads a concession to decorative products (Fig. 3:19-23). These were of the tubular variety and were fabricated by rolling a small rectangular sheet of beaten copper. A spiral type of join was present in one; the remainder possessed vertical joins. In one specimen a small bead had been hammered over another longer bead (Fig. 3:19).

Two complete and quite typical conical points and three fragmentary examples were found (Fig. 3:11-12). Eight projectile points of the socket tang variety were distinguished in the collection (Fig. 3:13-17) but these were far from typical, and in some respects appeared to be intermediate in form between the conical and true socket tang point. The conical type has no part which might be termed a blade, but simply a pointed end from which the artifact expands in conical form towards the base with the socket often extending almost to the point. Similarly, in the case of 7 of these 8 projectile points, nearly the entire length of the artifact was given over to socket with but a slight concession to a blade at one end where the socket gave way to a tiny flattened and pointed section. One of the socketed implements was divergent and might equally well have been classed as a socketed awl since it had an awl-like spike in place of a blade and a relatively short socket (Fig. 3:17). This implement was 6.9 cms. long; the remainder of the socketed projectile points, including the conicals, ranged from 2.6 cms. to the longest conical which was 6.3 cms. in length. All of the sockets were round in cross section and the blades, where present, were flat or concavo-convex, being simply an extension of the lower half of the socket, in the latter case. Neither the single nor double ridged blade, nor the rectanguloid ridged socket, which are common features of Wisconsin specimens, was present. There was no evidence of riveting in any of these points. A single barbed point was found (Fig. 3:18). It was perfectly flat in cross section and had one rounded barb. The base had been

20. 1952, fig. 13, p. 212.
21. Ritzenthaler 1946.
22. Ritzenthaler and Wittry 1952.
23. 1951.

broken off, but there was a suggestion that the artifact had been perforated, presumably for hafting purposes.

Of the 26 perforating or piercing tools recovered, 23 were straight, double pointed, and rectangular in cross section. These seemed to fall into three categories on the basis of length:

(1) There were 5 pikes ranging from 9.8 to 21.2 cms. One of these had flattened or chisel-like ends; the remainder were pointed. Erosion and patination increased toward either end and was least in the central and thickest portion of the implement; this suggested a center-hafting technique (Fig. 3:28-29).

(2) There were 9 awls ranging from 4.4 to 8.2 cms. These, like the pikes, appeared to have been center-hafted (Fig. 3:30-31).

(3) There were 9 gorges or needles ranging from 2.1 to 3.6 cms. Most of these were quite delicately executed and but for a slight reddish patination were in an excellent state of preservation (Fig. 3:32-33).

A fourth group of 3 perforating tools differed from those described above in being curved (Fig. 3:26-27). These might be called double picks since they seemed also to have been center-hafted and were double pointed. They ranged from 7.2 to 19.2 cms in length. Only one fish hook was recovered; it was 7.0 cms. in length (Fig. 3:34).

Two crescentic knives were found. One of these (Fig. 3:25) was 9.5 cms. long and possessed a distinct bevel to the cutting edge from a central ridge on both sides of the blade running nearly its entire length. There was also an indication that this specimen had possessed a tang which had been broken off close to the blade. Three other fragmentary knives, which may have been of the same type, were found; the longest was 13.7 cms. A single wedge, rectangular in cross section and 7.7 cms. in length, occurred (Fig. 3:24). Only one chopping implement, a trianguloid adze, 17.2 cms. long, 4.0 cms. wide (max.) and 1 cm. thick at the center, was recovered (Fig. 3:35).

The chief claim of the Farquar Lake cache to Old Copper status, aside from the purely negative fact that so many copper artifacts occurred together in the absence of pottery or other identifiable contextual data, would appear to lie in the presence of socketed projectile points. Thus, copper awls and similar tools have been found in Middlesex and Point Peninsula horizons in New York, for example, the square type being more common in the former context.[24] Likewise copper beads, fish hooks and adzes are known from Woodland and mound sites in Ontario and elsewhere.[25] The socketed projectile points, alone of the artifacts recovered, would appear to be diagnostic of the Old Copper industry, having never been found in undisputed association with known Archaic or ceramic cultures within the limits of their distribution in the Great Lakes region. Nevertheless, the Farquar Lake socket tang points differed in two important respects from those usually encountered. The most immediately apparent difference lay in their remarkably small size. Secondly, with the exception of the possible socketed awl, these points tended to be 'all socket' with a minimum blade allowance. This contrasts with the well known Wisconsin type which possesses a clearly defined blade usually two or three times the length of the tang.[26] The authors are aware of no similar specimens in the literature.

It is possible that the Farquar Lake material represents an early variant of the

24. Ritchie 1944.
25. Wintemberg 1928; Ritzenthaler 1946; Miles 1951.
26. Wittry 1951.

Old Copper industry. However, if this were the case, it might be expected that the Farquar Lake socket tang point would have a relatively broad distribution. On the other hand, if it were a late manifestation, this type should be in evidence elsewhere in Ontario at least, on the assumption that the region may have been a secondary center in the development of the Old Copper industry. It would, therefore, seem expedient to give some attention to the varieties and distribution of Old Copper artifacts from Ontario as a whole.

PREHISTORIC COPPER ARTIFACTS FROM ONTARIO

A sample of 123 prehistoric copper artifacts (not including beads of which there were about 650 representing 5 strings) was employed for this study. The sample comprised the entire collection of the Royal Ontario Museum but for a few items which may have been overlooked and a small number which were rejected for want of provenience data. Since the total number of prehistoric copper artifacts from Ontario in both museum and private collections probably does not exceed four or five hundred,[27] this may be considered a fairly representative sample.

All of the artifacts included are quite certainly prehistoric and fabricated from native copper, but it cannot be said with equal assurance that all are products of the Old Copper industry. It is not difficult to decide which artifacts should be ascribed to the latter, but it is another matter to decide which should not be so classified. For example, rat-tail and socket tang points and possibly the tanged crescentic knife, offer no difficulties, but copper axes, unsocketed adzes, awls, fish hooks and beads occur in known ceramic horizons as well as in the Old Copper.[28] About 25% of the artifacts in our sample fell into this category of uncertainty, and a very few of these were known definitely to have been found in mounds or Woodland deposits.[29] However, since provenience data, beyond township location, were not available for most of these items, it was decided to include all prehistoric copper specimens in the Museum collection rather than make a necessarily arbitrary selection. This procedure was supported by the fact that the artifacts of doubtful status proved to have a similar distribution to those of typical Old Copper form.

There was a total of 41 projectile points in the collection of which 16 were of the socket tang variety and quite typical in form. These latter ranged from 7.7 to 23.0 cms. in length (mean: 13.3) and their tangs, ranging from 1.9 to 5.8 cms. (mean: 4.3), were on the average about half the blade length. In general, the maximum blade width, ranging from 2.0 to 4.2 cms., but slightly exceeded the greatest breadth of the tang which usually flared slightly at its base. The most common variety of socket tang point, of which 10 occurred, was that illustrated in Fig. 4:2; all of these were ridged, in 7 cases on one side only, and in 3 cases on both sides. There were two points of the type shown in Fig. 4:3. Only 3 of the 16 socket points were flat in cross section or unridged. Two of these were variants in form falling between the examples in Fig. 4:2 and 3, and the third was the large specimen, of which only one occurred, in Fig. 4:4. One of the type indicated in Fig. 4:1 was present. This one and three of those on the pattern of Fig. 4:2 possessed perforated tangs to accommodate rivets. Thirteen of the points were so constructed that the floor of the tang was lower than the blade, thereby creating

27. See, for example, Wintemberg's summary 1929.
28. See notes 25 and 26.
29. Wintemberg 1928. pp. 184-189, has summarized most available data on such associations for Ontario.

an abutment for the shaft of the projectile.

Only one conical point, 5.2 cms. long with a maximum diameter of 1.5 cms., occurred; it was similar to one from Farquar Lake (Fig. 3:12). Another example from Allumette Island, Quebec, was reported by Wintemberg.[30]

Four spatula tang points occurred. One of these had a long tang (5.0 cms.) just under a third of the blade length (Fig. 4:5) and 3 had short tangs between a fifth and an eighth of the blade length (Fig. 4:6). These four points ranged in total length from 7.7 to 18.8 cms. (mean: 12.7) and varied in maximum blade width from 2.7 to 3.2 cms.

There were nine rat-tail tang points in the sample. Three were of the type shown in Fig. 4:7 and two were examples of Fig. 4:8 which differed from the former type in having a thicker, blunt-ended tang and a smoother expansion of the blade which achieved its maximum width near the center rather than the base. Three specimens fell between these two types in form. One specimen, which perhaps did not belong in the rat-tail category, was shorter than the others and possessed a thick, stubby tang with a flattened tip. However, its aberrancy lay chiefly in the presence of two parallel ridges, running the length of each face of the blade, instead of the more usual single central ridge. Barring this projectile point, the remainder ranged in length from 11.0 to 18.6 cms. (mean: 14.2) and their tangs from 2.0 to 5.2 cms. Six of these blades were ridged on both sides and two on one side only. A rat-tail point, similar to that shown in Fig. 4:7, from Fairy Lake, Quebec, has been reported.[31]

There were 8 notch-tang points in the collection. Four of these (Fig. 4:9) were of the type grouped by Flaskerd[32] with the rat-tails and varied in length from 15.6 to 24.4 cms. (mean: 18:6). Three points were of the type shown in Fig. 4:10; these resembled Flaskerd's turkey-tail variety. One point of the type sometimes referred to as the serrated or tooth tang, occurred (Fig. 4:11). The latter four points ranged from 7.3 to 9.7 cms. in length. Four of the 8 points were ridged on both sides and 4 on only one side. Maximum blade width varied little throughout (1.8 to 3.8 cms.). The grouping of these points together, into a single typological category, may be shown by future studies to have been unjustified. However, for the present, similarity in blade form and the presence of a similar hafting principle supported this classification. A point similar to Fig. 4:10 from New York has been illustrated by Beauchamp.[33]

Three points similar to Fig. 4:12 occurred. These were ridged on both sides and varied in length from 14.5 to 16.9 cms. The blades were narrow (2.2 to 2.6 cms.) in all cases. In one of these no definite tang was present. From the rounded base, the artifact tapered symmetrically to a sharp point and did not exhibit the slight constriction which marked the tang portion in the other two specimens.

Of the 13 knives in the sample, 5 were fabricated in the fashion of the specimen shown in Fig. 4:13. The blades of 4 of these were ridged on both faces and bilaterally bevelled to both edges. Hence, these possessed two cutting edges, one concave and the other convex. In the fifth case, only the convex edge had been prepared for cutting. The 5 knives in this group ranged from 17.4 to 24.5 cms. (mean: 20.4) in total length and their tangs from 3.8 to 7.5 cms. (mean: 6.1). Maximum

30. 1929, plate X:6.
31. Ibid X:1.
32. 1940.
33. 1902, plate 5:16.

blade width varied little (3.1 to 3.8 cms.). There were 5 specimens of the type shown in Fig. 4:14 with straight, or in one case, slightly concave backs and straight or very slightly convex cutting edges. The blade of one of these had been bent into a semi-circle so that it resembled a historic Algonkian crooked knife, but otherwise, it was of the Old Copper type. This group ranged from 13.0 to 36.0 cms. in total length (mean: 24.0) with tangs from 5.0 to 8.4 cms. There were two knives with a perforation at one end, presumably to accommodate a hafting rivet; one of these was 13.9 cms. long (Fig. 4:15), the other was 19.2 cms. and differed slightly in shape.[34] Finally, a small leaf-shaped knife occurred. It was pointed at both ends, both edges were sharpened, and it was unridged. It was 11.0 cms. long and 2.2 cms. in maximum width.

Ten perforating tools were included in the sample. Four of these were long, heavy pikes ranging from 25.7 to 49.8 cms. in length (mean: 34.1) and from 1.4 to 2.3 cms. in maximum diameter. Three of these were rectangular in cross section and the longest was round. Two were sharply pointed at both ends, one was pointed at one end and blunted by hammering at the other, and one had flattened chisel-like ends with slightly convex edges. There were 5 awls, rectangular in cross section and pointed at both ends. These ranged from 6.8 to 20.4 cms. in length (mean: 14.2). One punch, 6.7 cms. long, was rectangular in cross section, flattened at one end to produce a tiny cutting edge and considerably burred-over at the other as a result of repeated hammering.

Two unusual rat-tail spatulas (Fig. 4: 16) measured 16.5 and 16.2 cms. from the tip of the tang to the edge of the blade. The tangs of both were 9.4 cms. in length and the maximum breadth of the spatulate portion was 6.4 and 7.5 cms., respectively.[35] A similar type of artifact from Wisconsin, though less symmetrical and with a shorter tang, was reported by West.[36] A small unilaterally notched spatula, 10.1 cms. in length, also occurred.

Four crescents were included in the sample although, according to Flaskerd,[37] specimens of the kind illustrated in Fig. 4:17, differ typologically from the true crescent and probably should be classed as hair ornaments. The blade or crescent of this artifact had a maximum width of 6.5 cms. and prongs of 8.6 and 9.9 cms. in length. The crescent with connected prongs (Fig. 4:18) was 9.1 cms. in height and breadth. The side-pronged crescent (Fig. 4:19) was 8.9 cms. in maximum blade width. A canoe-shaped prongless crescent, 7.5 cms. in length, also occurred.

One fish hook, two small, and two very large gaffs were included. The latter possessed straight shafts, rectangular in cross section, and straight pointed arms slightly turned up at the ends. The shafts were 30.7 and 34.0 cms. in length and the arms 10.0 and 11.0 cms., respectively. The latter made a 70 and an 80 degree angle with their respective shafts.[38] Another gaff and two hooks from northern Ontario and Quebec locations were reported by Wintemberg.[39]

There were 22 chopping or wood-working tools in the collection. Three of these were socketed adzes. The two short-socketed specimens, of which one is shown in Fig. 4:20, were provided with an abutment for the shaft of the implement. The specimen illustrated was 10.8 cms. in length. The other was 11.5 cms. and was provided with a much deeper socket and

34. See Ont. Prov. Mus. 1890-91, pp. 59-63.

35. Ibid 1907, p. 35; 1912, pp. 46-54.
36. 1929, plate 27:7.
37. 1940, p. 49.
38. See Ont. Prov. Mus. 1928, pp. 51-54.
39. 1929, plate X:7-9.

more pronounced abutment.[40] The long-socketed adze (Fig. 4:21) was 14.4 cms. in length and was also provided with an abutment. A specimen similar to Fig. 4:20 from New York was reported by Beauchamp,[41] and one from Aitkin County, Minnesota, by Flackerd.[42] A long-socketed adze, similar to Fig. 4:21, was reported to have been found in a grave near Brockville in southeastern Ontario.[43]

Five unsocketed adzes, four of which were of the type illustrated in Fig. 4:22 and one ovate triangular adze shown in Fig. 4:23, occurred. These ranged from 14.4 to 26.2 cms. in length (mean: 19.6). Two ovate triangular axes similar in form to the adze in Fig. 4:23 but possessing a bilaterally bevelled cutting edge, were included. These were 15.6 and 19.8 cms. in length. Only one chisel, 20.1 cms. long, occurred (Fig. 4:24). It possessed a double groove just below the butt end. A single gouge, 13.1 cms. in length, was included (Fig. 4:25). It was similar to one reported from Wisconsin by West.[44]

Four small trianguloid axes (Fig. 4:26) and 6 rectangular axes (Fig. 4:27) were present. All of these were rectangular in cross section and unridged. The range in length for the 10 specimens was from 8.0 to 13.7 cms. One of the rectangular examples appeared to have been a double axe, a cutting edge having been prepared at both ends; it had presumably been center-hafted.

Only two non-utilitarian types of artifacts were present in the collection, namely beads and bracelets. Most of the former, of which there were about 650, were small and spherical in form, ranging from 0.4 to 1.1 cms. in diameter. All of these had been fabricated by rolling tiny sheets of hammered copper; none were drilled out. About 450 of these beads were said to have been recovered in three strings from the neck of a skeleton in the Princess Mound,[45] Rice Lake. The remainder were found in two strings with five copper claw-like objects, three on one string and two on the other.[46] One of the latter two strings was found on Wolfe Island in the entrance to the St. Lawrence River. The other was found on the mainland north of this island. Twenty-two of the 25 bracelets in the collection were also found in the latter two areas but it is not known whether any of these occurred together. Similar bracelets have been found in Wisconsin.[47] Thirteen were plain circlets similar in appearance to heavy copper wire, though, in most cases, the upper and lower surfaces had been slightly flattened. The outer surface of twelve bracelets had been notched entirely around. The maximum diameter of the 25 specimens averaged 6.5 cms.

Most of the copper artifacts in this sample fall readily into the typological categories established for collections from Wisconsin[48] and Minnesota.[49] However, one feature should be stressed for the light it may throw on the chronological position of Old Copper manifestations in the Province. It was noted that 13 of the 16 socket tang points were constructed so that the socket floor was lower than the blade to provide an abutment for the shaft. According to Wittry's distributional data,[50] this modification may have been a relatively late development. This might suggest that trade or movement of Old Copper peoples into Ontario did not occur until towards the end of the Old Copper period. However, little is known about the

40. See Ont. Prov. Mus. 1886-87, pp. 54-56.
41. 1902, plate 1:1.
42. 1940, opp. p. 56, No. 454.
43. Wintemberg 1928.
44. West 1932, plate 72:1.
45. See Ont. Prov. Mus. 1896-97 on mound sites in Ontario.
46. Ibid 1887-88, p. 49.
47. Wittry 1951.
48. Ibid.
49. Flaskerd 1940.
50. Wittry 1951.

relative age of most of the other types of artifacts in the collection, and some types considered late by Wittry, such as the fish-tail tang, leaf-shaped tangless, and square tang point, are not reported at all. Finally, it may be noted that the Farquar Lake socket tang points remain "aberrant" both as regards Wisconsin-Minnesota forms and those known from other Ontario locations.

The distribution of the 123 artifacts in the collection has been indicated by means of dots on the accompanying map (Fig.1). An additional 20 specimens, which were illustrated and listed with National Museum catalogue numbers by Wintemberg,[51] were also plotted on this map. Each of the 5 strings of beads was represented by a single dot. When more exact information was lacking, the dot was placed near the center of the county in which the artifact occurred. However, in most cases, location by township was known and, in a few instances, quite specific provenience data were available. This distribution may be conveniently divided into three areas for descriptive purposes.

The northern area, including Manitoulin Island and that part of the Province from Lake Nipissing to the Manitoba border, is represented by only 20 artifacts or 14% of the total sample. Most finds have been made in the vicinity of Fort William or in the Nipigon River area. The two largest pikes and gaffs and the two rat-tail spatulas were found in these areas.

The southwestern area from Lake Simcoe to Lake St. Clair is bounded in the north by Georgian Bay and in the south by Lake Erie. There were but 27 artifacts or 19% of the total sample reported from this part of the Province. These occurred rather sporadically throughout the area with perhaps a slight concentration near the headwaters of the Thames River. No gaffs, fish hooks, crescents, spatulas, bracelets or beads occurred; the remaining varieties of copper artifacts were represented.

The southeastern area comprises the rest of the Province and is bounded in the north by the Ottawa River and in the south by Lake Ontario and the St. Lawrence River. Ninety-six artifacts (not including 5 strings of beads) or 67% of the sample occurred in this area, not to mention the Farquar Lake cache. The majority were found in the Kawartha Lakes district (a chain of lakes and rivers beginning with Balsam Lake and culminating in Rice Lake), in the vicinity of the Bay of Quinte, and east to Wolfe Island and the mainland north of it. It is noteworthy that all of these localities are just south of the Laurentian Shield. In the west, the latter extends southward as far as the Severn River which connects Lake Simcoe with Georgian Bay. Thence, its terminus runs southeastward, reaching the St. Lawrence at a point somewhat east of Wolfe Island. Only the Farquar Lake cache and a few sporadic artifacts to the east occurred on the Shield in this part of Ontario. It should be noted that at least a few of the artifacts, indicated in the immediate neighborhood of Rice Lake, probably were not products of the Old Copper industry as such. These included a trianguloid axe from the Otonabee Mound[52] and an adze and three strings of beads from the Princess Mound on Sugar Island in Rice Lake. Finally, the concentration of artifacts indicated for Wolfe Island and vicinity may prove to be misleading since 22 of the artifacts were bracelets, many of which may have been found in a single cache.

It is surprising that so few copper artifacts have been found in the northern area of the Province when its proximity to one

51. 1928, 1929.

52. See Ont. Prov. Mus. 1896-97, op. cit.

of the chief sources of native copper (Isle Royale), and to a principal center of the industry (Minnesota), is considered. This is doubtless due in part to the fact that the area, having been much less inviting to European settlers than southern Ontario, is less well known archaeologically. There is also the possibility that the principal route of trade or diffusion of Old Copper artifacts into Ontario ran to the south of this region. Southwestern Ontario does not seem promising in this regard; the small number and sporadic occurrence of specimens probably represent no more than minor infiltration from upper Michigan. However, the distribution of copper artifacts in southeastern Ontario, south of the Laurentian Shield, lends some support to the hypothesis. The absence of many artifacts on the Shield, other than at Farquar Lake, again may be due to lack of knowledge of an area which has little farming and a relatively low population density. In addition, it seems likely that more specimens from Renfrew County and vicinity, the areas just west of Allumette Island, would be found in the National Museum than occurred in our sample; the authors have seen one private collection which contained a number of copper artifacts from localities in Renfrew County. On the other hand, both archaeological and ethnohistorical data pertaining to the Kawartha Lakes area, where many of the copper artifacts were found, testify that this waterway was a favorite route of travel and area of settlement in prehistoric and early historic times. A short portage from Balsam Lake connects this waterway with Lake Simcoe and thence, via the Severn River, with the upper Great Lakes in general. Southeastward, the system is drained into the Bay of Quinte and thus leads the traveller to eastern Lake Ontario and the St. Lawrence River.

In summary, it would appear that the Farquar Lake cache is unique, not only from a typological standpoint as indicated by our failure to find the Farquar Lake socket tang point elsewhere in the Province, but also in geographic location. Unlike most Old Copper artifacts from Ontario, this material was found on the Laurentian Shield and to the north of the area of primary concentration (if one may speak of a primary concentration on the basis of our small sample). Moreover, the relative paucity of copper artifacts from the Province, which probably do not exceed four or five hundred in number as previously noted, does not support the suggestion made earlier that Ontario may have been a secondary center of the Old Copper industry. Certainly, if one disregards the Farquar Lake material, there remains the impression of a decidedly peripheral area to which a few products of the industry had drifted through trade or were brought by occasional nomadic bands of western copper-using people whose hunting expeditions had carried them farther afield than usual.[53] On the other hand, nearly half of the copper items recovered at Farquar Lake were blanks or indeterminate fragments suggesting that artifacts had been fashioned on the spot. However, the absence of hearths then becomes difficult to understand since repeated annealing, or at least reheating, is mandatory in copper working.[54]

The absence of known later types at Farquar Lake and the "undeveloped" nature of the socket tang points, which resemble conicals in certain respects, incline the authors to the suggestion that this cache represents an early variant of Old

53. However, southern Ontario is neither the only nor the most easterly area in which Old Copper artifacts occur; these have also been reported from New York (Beauchamp 1902) and Quebec (Wintemberg 1929).

54. Frank 1951, and see the review of experimental studies in Martin et al. 1947.

Copper, possibly prior to the development of the true socket tang point which could be a derivative of the conical type. However, there is no direct evidence which bears on this hypothesis one way or the other at present. A first step might be a study of the distribution of the conical point in order to determine whether there is any evidence of its temporal priority over the socket tang in the development of the Old Copper industry. Secondly, a search of likely beach locations in the southern part of the Laurentian Shield should be made in the hope of bringing to light further material of Old Copper type. Until work of this sort has been undertaken, the relative age and specific relationships of the Farquar Lake cache are likely to remain largely in the realm of speculation.

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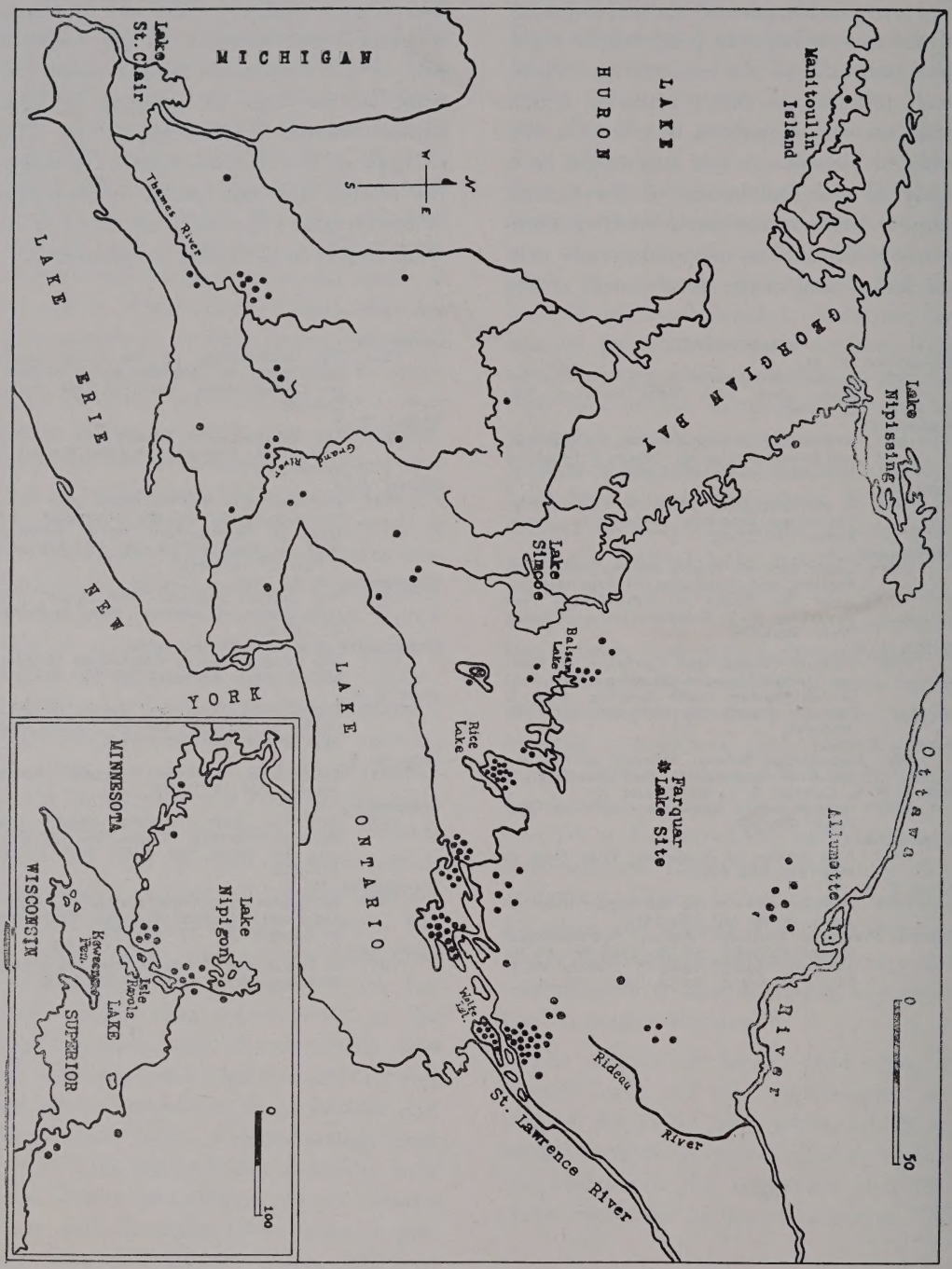

Fig. 1 The distribution of prehistoric copper artifacts in Ontario.

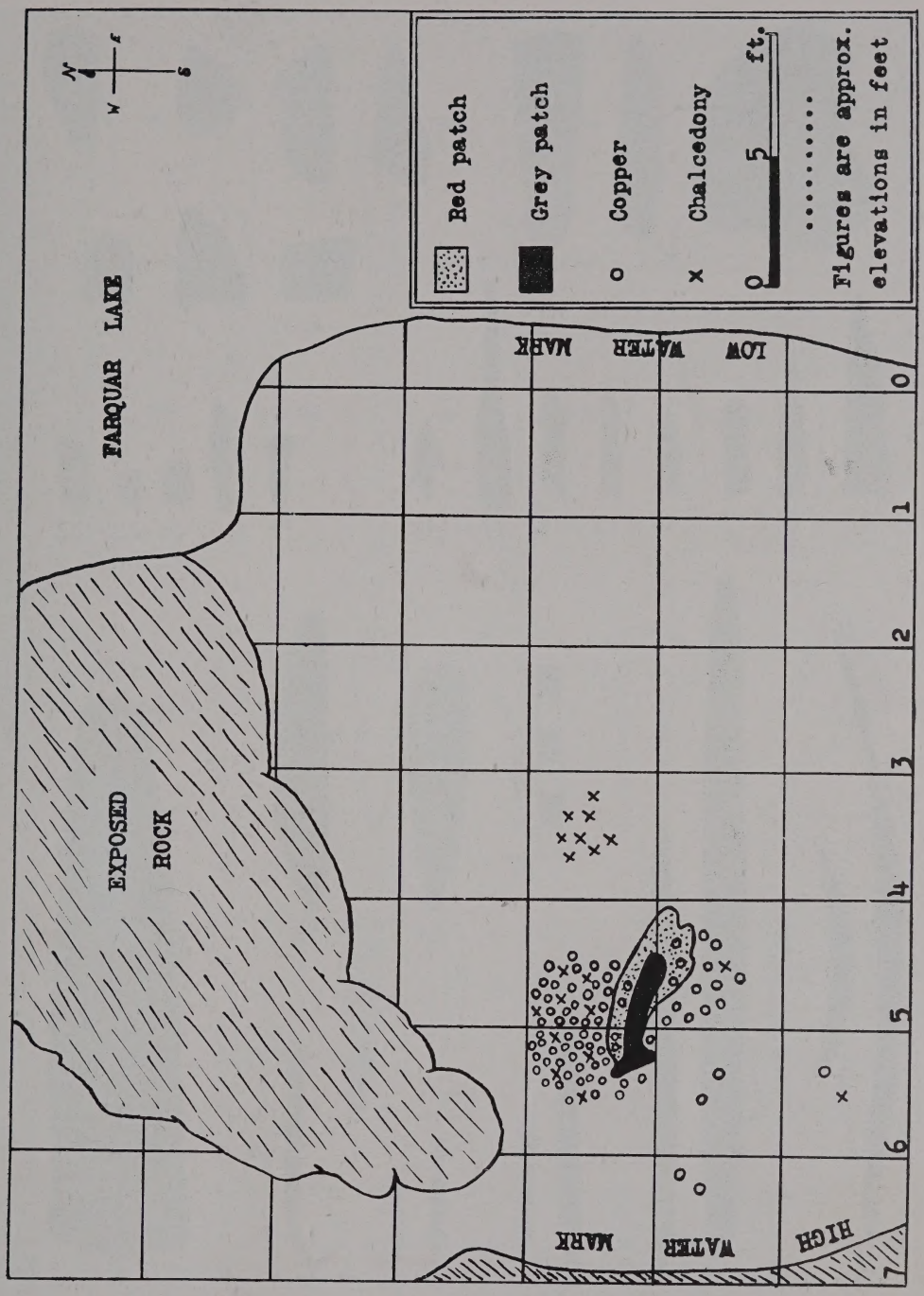

Fig. 2 Grid map of the Farquar Lake Site showing the distribution of artifacts.

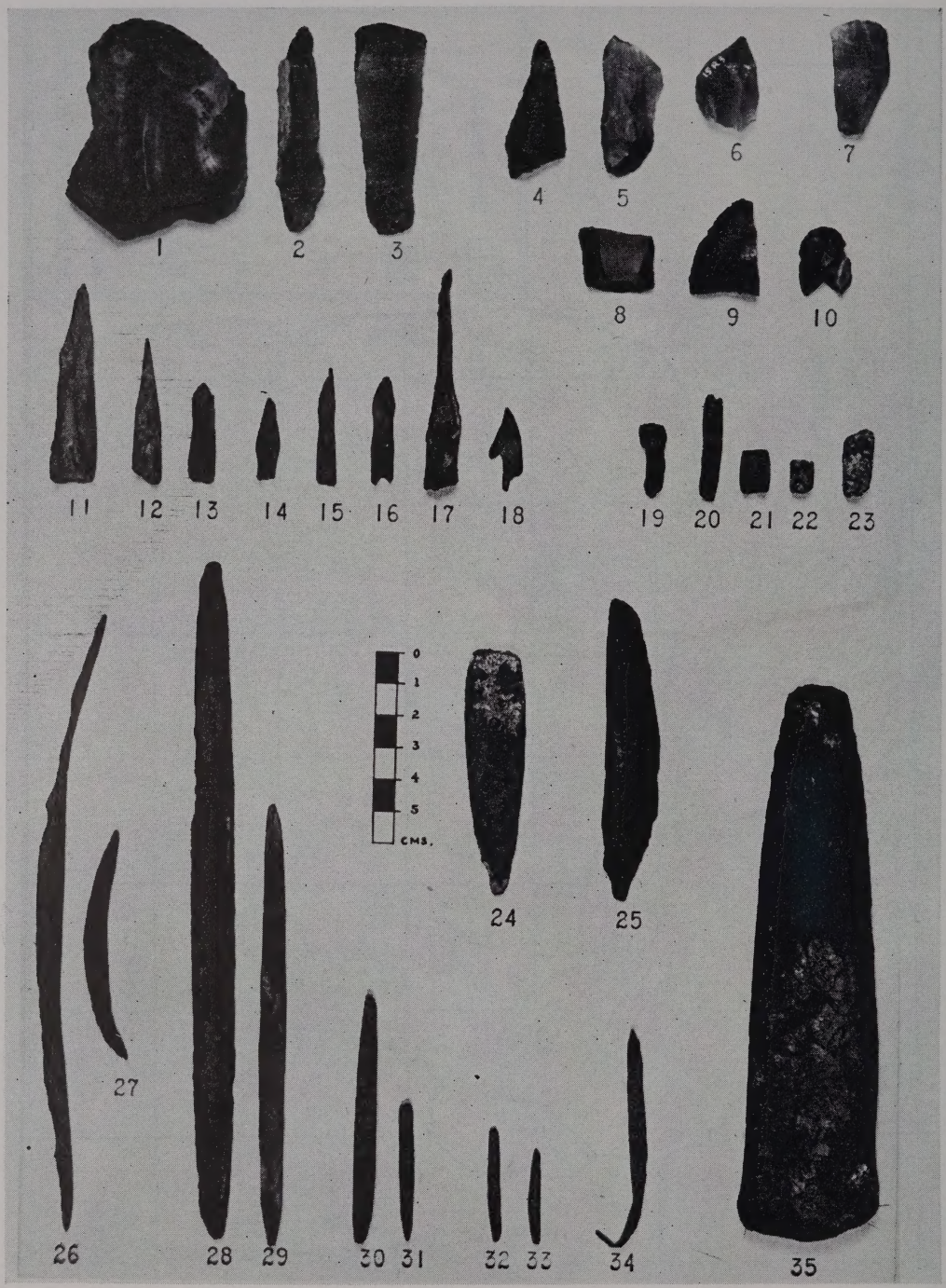

Fig. 3 Chalcedony and copper artifacts from the Farquar Lake Site, Haliburton County, Ontario.

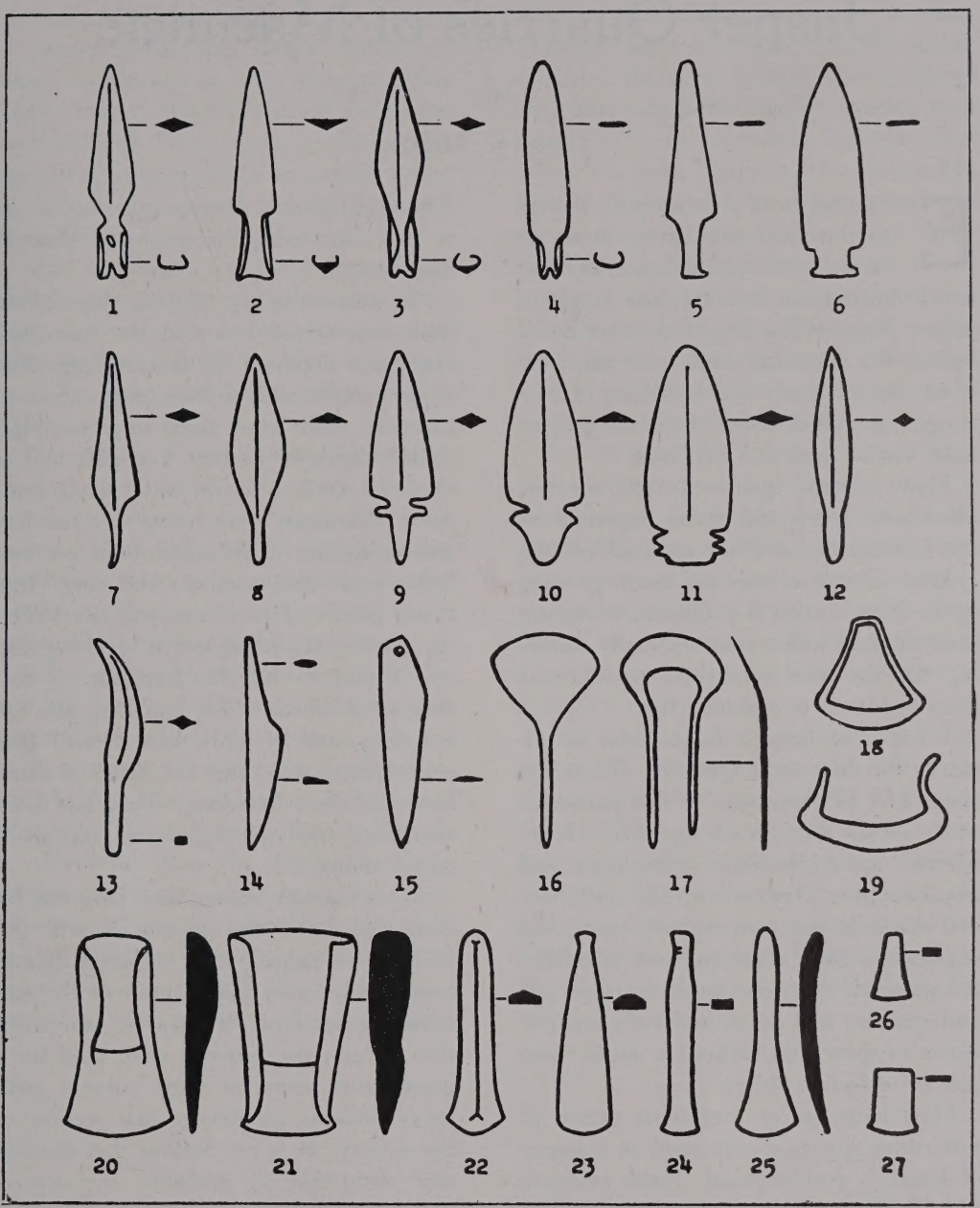

Fig. 4 The principal varieties of prehistoric copper artifacts in Ontario. Drawings have been reduced to different scales but the form and proportions of the original specimen have been preserved in each case. However, cross sections have been accentuated for the sake of clarity.

Jasper Quarries of Macungie

By

James S. Miller

Extending from a point near Topton to the Delaware River, there are at least 325 pits or quarries from which the Indians obtained their supply of jasper. Some of the largest quarries, and I believe the ones that were used most, are those located south and southeast of Macungie, as well as those located about four miles farther east at Vera Cruz.

Many of these quarries or pits are now filled with debris and stones deposited by the farmers in an effort to level off the ground, as well as trees and brush growing up in them, so that it is difficult to discern some of them unless one is actually searching. On the other hand there are others as deep as fifteen to eighteen feet.

What is of interest to us today is primarily the Macungie Quarries. There are about fifty of these pits in this particular area. About fifty years ago Mr. Henry Mercer, an enthusiastic archeologist and historian from Doylestown, Pa., spent several weeks in this territory excavating and exploring some of these quarries. Mr. Mercer made an extensive study of these pits and quarries and discovered sufficient evidence to show that without a doubt these pits are of Indian Origin.

How long ago or over what period of time these quarries were used as a source of jasper is problematical. Some evidence is forthcoming from the fact that in one of the largest pits Mercer found the stump of a tree about four feet in diameter with 195 rings. Computation would thus indicate that this particular pit was abandoned about 1680-90. Mr. O. P. Knauss, also a well known archeologist and writer, in his article printed in an issue of the Lehigh County Historical Society, has this to say in part concerning the results of Mercer's excavating:

"In excavating one of these depressions, there was found lying on the unworked clay, at a depth of 18 feet, a large disc-shaped implement of limestone, a foot in diameter, well worn along its outer edge. At the depth of 14 feet, a smaller tool of quartzite similarly worn, and a coarse limestone arrowhead were found. At the bottom along one of the sides of the pit, two holes were discovered in the clay. Into these, plaster of paris was poured. When the plaster was hardened, it was dug out, and found to be the facsimile of two sharpened billets which had long ago rotted away, and left only their mould. One of the pieces was about six inches in diameter, and three feet long. They had been sharpened with the aid of fire, and sharp edged stones."

As mentioned before, how long the Indians inhabited this section is still unknown, but judging from the great quantities of chips and spalls found in the surrounding territory, it may be concluded that either these quarries were used for a great many years, or there were a great many Indians inhabiting this section of the county. It is my feeling that the former deduction is probably the correct answer.

It appears that after the jasper was quarried, it was broken up into smaller particles and carried for great distances since jasper of the Macungie type has been found in New York State, as well as in Connecticut. It has also been found in Maryland, and Mr. C. A. Weslager, in

his book, "Delaware's Buried Past," refers to arrows made from jasper which evidently originated in the Macungie-Vera Cruz territory. Naturally as the Delawares also inhabited New Jersey, a considerable number of jasper artifacts have been found in that state, especially in the Delaware River Valley.

After the larger pieces of jasper were broken into smaller particles, they were made into arrows, knives, scrapers, and other implements. Very seldom was jasper used for axes, tomahawks, celts or ornaments.

Webster describes jasper as "An opaque, many-shaded variety of quartz." It is found in various colors, the yellow, red, brown, blue and black predominating. Sometimes there are several colors blended into one artifact, such as brown and white, red and blue, yellow and brown, etc.

It is not my idea to leave the impression that the Macungie Quarries were the only source from which the Indians obtained their materials for the making of arrows, etc. At Vera Cruz, about four miles east of Macungie, there are approximately 138 pits. At Durham, near the Delaware River, there is also a very large deposit of jasper. However, it is rather significant that close to the quarries there are very few arrows found. This is true of all the quarries I have had the pleasure of investigating. This is particularly true of the Durham Quarries. Here as well as at the Macungie Quarries, there are acres of farm land and woodland which are literally covered with chips. It is to be noted, however, that when Mr. John Witthoft, Mr. Farver, Mr. Harvey Huber, and the writer looked over a vast area here, we did not find a single arrowpoint. Many hammerstones of all sizes and shapes were found, however; this justifies my belief that these quarry sites were merely what the name denotes: a source of materials from which to make the artifacts found elsewhere.

As you leave the quarry sites, you come to the camp sites and workshops, and it is here that the finished products are encountered. Here, too, will be found such other implements as axes, celts, scrapers, beads, ornaments, etc. Very little pottery has been found in or around the Macungie-Vera Cruz camp sites or, in fact, anywhere in Lehigh County.

Just to digress for a moment, while jasper is the predominating material of the artifacts found in and around Macungie, there are also many artifacts found which are made from other materials, such as quartzite, found abundantly in Berks and Lebanon Counties; quartz, from Bucks and Montgomery Counties; argillite, from Bucks County, and rhyolite from farther west.

Pottery from the Stewart Site, Clinton County, Pennsylvania

John Witthoft

The Charles Stewart Site, on the north bank of the West Branch of the Susquehanna River, is located almost opposite McElhattan, and lies on the high terrace edge back of the canal ditch in the second field west of the Stewart house, almost at the edge of an old racetrack.[1] It was discovered and dug in August, 1934, by Dr. T. B. Stewart of Lock Haven, who had been raised on this farm, and this report is based on a study of the pottery preserved in his collection.[2] A preliminary anonymous report on the site, probably written by Frederick Godcharles, identifies the cultural material as Andaste and mentions many nonceramic objects from the site which I have been unable to find in the Stewart collection.[3] This report is so obviously inflated and erroneous, particularly in its cursory discussion of the artifacts, that reexamination of the specimens is necessary. My discussion is limited to the pottery, since this is the most diagnostic material, and, with the exception of a few pipe fragments, is the only noteworthy material I have seen from the site. The sparsity of other artifacts is probably in part due to the small sample involved, and in part due to the use of hired labor on the site with consequent pocketing of more attractive specimens.

My analysis is based on a series of about twelve hundred sherds, including slightly more than two hundred rimsherds representing at least eighty different pots. No Andaste sherds are present, and, with the exception of a few sherds derived from four pots of unknown types, all of the ceramic material is of the Shenk's Ferry tradition, not a part of any Iroquoian or Owasco series. In a previous article, I have identified the Stewart Site as one of a large series of hamlets or tiny floodplain villages of the last prehistoric culture stage of the West Branch Valley and middle Susquehanna Valley, very closely related to the Shenk's Ferry complex of the lower Susquehanna Valley.[4] Pottery type description and reference to other published material on pottery of the Stewart-Shenk's Ferry types are omitted here because they were incorporated into my earlier paper. The Stewart Site is of primary importance because it represents the only sizeable sample from a pure site of the northern variant of the Shenk's Ferry complex; it is the only excavated series which is not mixed with other pottery types. Pottery precisely like that found here is extremely abundant in survey-collections from almost the total of the West Branch Valley and the middle Susquehanna. My major task here is the comparison of the Stewart pottery with Shenk's Ferry pottery.

I would ascribe all of the Stewart pottery (with the exceptions previously men-

1. The Stewart Site is located within the Lock Haven Topographic Sheet, Edition of 1923, 6 and 31/32 inches east of the printed inner borderline at the west edge of the sheet, and 5 and 5/16 inches south of the north edge.
2. The T. B. Stewart Collection is now in the Waynesburg College Museum, Waynesburg, Penna., and the material from the Stewart Site is represented by about thirty small boxes of material, labeled but not cataloged, which I have segregated from the rest of the collection and which are stored separately.
3. Anonymous, Rich Variety of Andaste Indian Material Yielded by Excavating Longhouse Sites in Clinton County, Pennsylvania, **Penna. Arch.,** Vol. 4, No. 3, 1934, pp. 13-15.
4. John Witthoft and S. S. Farver, Two Shenk's Ferry Sites in Lebanon County, Pennsylvania, **Penna. Arch.,** Vol. 22, 1952, pp. 3-32.

tioned) to the two Shenk's Ferry types which I have described elsewhere, Shenk's Ferry Incised and Shenk's Ferry Corded.[5] Like the sample on which those descriptions are based, all of the Stewart pottery was round-based, with channeled collars of peculiar form, crushed-rock tempered, cordmarked, and of somewhat gritty paste. The average texture is a little more crumbly and a little less sandy than the Shenk's Ferry series, but the range is almost the same. Cordworking, sherd color and hardness, thickness, frequence of moderate lamination, and interior surface treatment are almost identical. All of the rim shapes and all of the decorative motifs of the Stewart complex can be duplicated in the Shenk's Ferry series, but the converse of this statement is definitely not true. Certain Shenk's Ferry motifs and varieties are unknown in the Stewart series, and the incidence of occurrence of certain motifs is somewhat different.

Certain differences between the two series would serve to distinguish a collection of one area from one of the other, but would not serve to separate most individual sherds. Limestone temper, a rare Shenk's Ferry aplastic, is unknown in the Stewart series. Green gneiss temper, a very frequent Shenk's Ferry trait (about 15%), does not occur in the Stewart series. About three per cent of the Stewart sherds are tempered with crushed chert river-pebbles; this does not occur in the Shenk's Ferry series. Most sherds of both series are tempered with crushed vug quartz or hard shale, and the paste is indistinguishable. The collection from the Stewart Site includes four toy pots; these are also well-known from the Shenk's Ferry sites.

Shenk's Ferry sites usually have between twenty and forty per cent of the pottery not incised, but cordmarked or decorated with the cord-wrapped paddle edge. Less than ten per cent of the Stewart pottery lacks incising, and non-incised sherds in the run of my surface collections from other sites are much less frequent than this. All of the cordmarked, non-incised Stewart rims are ascribed to the Shenk's Ferry Corded type, but they pertain to the minor element of that type in the Shenk's Ferry sites; they lack the paddle-edge decorations. Essentially they are from pots that were not decorated, whereas the majority of the corded type from the lower Susquehanna show paddle-edge decoration. Sherds from all of the corded pots are illustrated (Pl. 2, L-S). Two single rimsherds from the Stewart site, both incomplete, show paddle-edge decoration (Pl. 2, T, U). They more closely resemble Owasco sherds than they do any of the Shenk's Ferry series, but they are not precisely like any other pottery I have seen. They, like a single bar-stamped rim (Pl. 2, T), may be trade sherds from another area, or eccentric forms in the local series.

Several of the corded rims show smoothing of the neck area, even though there is no decoration (Pl. 2, L,M,N,P), and all of the other rims show a strong tendency to smoothing of the neck but not of the rim of the pot. This is one of the distinctive Shenk's Ferry traits. All of the sherds with rim-incising also have neck incising, but about fifteen per cent of the sherds have incising *only* on the neck (Pl. 2, A-K). These features also hold for the Shenk's Ferry series; neck smoothing is more frequent than incised decoration, and often occurs without decoration; incising rarely occurs without neck smoothing; incising is more frequent on necks than on rims; rim incising does not occur without neck incising; rims are usually incised over cordmarking, rarely smoothed; neck incising rarely occurs on a cordmarked neck. Lips are more often corded in the Stewart

5. **Ibid,** pp. 15-21.

series, while almost half of them are smoothed or wiped in the Shenk's Ferry series. Both series have precisely the same type of incising, generally broad, with striations within the trough, rather clumsy, out of parallel, and applied with dragging, uneven force. The incised lines were probably trailed on with the corner of the potter's paddle. Often the Stewart incising is a little less clumsy than in Shenk's Ferry.

The rim-incising motif in the Stewart series is the ordinary Shenk's Ferry motif, several parallel horizontal lines encircling the pot, broken by concentric "V's," often inverted, at castellations. (Pl. 1 is made up almost entirely of such rims.) Castellations in the Stewart series are rare, but more pronounced than Shenk's Ferry castellations (Pl. 1, No. 4, 8, and 12, and Pl. 2, N, are all of the examples from this site.) Oblique parallel lines occur on the rims of a few Stewart sherds, and are somewhat commoner in Shenk's Ferry (Pl. 1, No. 1, 3). The more elaborate incised rims, including those with chevron motifs which occur at some Shenk's Ferry sites, are unknown in the Stewart series, and the Stewart rims show less variability than do the Shenk's Ferry rims. The band of oblique parallel gashes at or below the lower rim edge of the Shenk's Ferry series is also conspicuous at Stewart's (Pl. 1, No. 2, 4, 7, 11, 14, 15, 26, 27), but it tends to be exaggerated in the Stewart series and integrated into the neck decoration. Most frequently it has become a part of horizontal herringbone plats and trianguloid plats within the neck decoration, but not continuous around it. (Pl. 1, No. 1, 3, 5, 8, 13, 15, 16, 19, 20, 21, 22, 23, 29, 30.) This is a rare motif in Shenk's Ferry, the extension of the lower rim-edge gashes into the neck design. The most usual Shenk's Ferry neck-decoration motif is a series of parallel, horizontal encircling lines everywhere below these gashes. These pot-encircling lines are apparently very rare or absent on the necks of the Stewart pots, and their place is taken by series of open plats of parallel lines, mainly simple horizontal herringbones alternate with triangles (Pl. , No. 1, 7, 13, 21, 23, 29, Pl. 2, A, K), rarely sets of triangles (Pl. 1, No. 6, 17). These neck-plat motifs are very rare in the Shenk's Ferry series, usual in the Stewart series, and this one detail is the most important distinction which I can see between the two series. Shenk's Ferry pots very often have another horizontal band of oblique gashes at the base of the neck decoration, corresponding to the band at the top. In the Stewart series, this lower band, where present, seems to have been likewise incorporated into the neck design rather than bordering it as an encircling band. The Stewart pottery shows a greater complexity and variety of neck incising and a lesser variety of rim incising, as compared to the Shenk's Ferry series of the same pottery type. This and the absence or near-absence of cord-wrapped paddle edge work serve to distinguish the pottery of the Stewart area from that of the Shenk's Ferry area. I believe these are minor geographic differences between the artifacts of people who were practically alike in their material culture, and I do not think the differences are important enough or exclusive enough to merit the separation of the pottery into type by areas. These are exceedingly minute distinctions, compared with the differences between Shenk's Ferry pottery and that of other tribal areas nearby at the same time level.

Several sherds from the same pot represent a very different pottery type, and two of these sherds are in a box marked "pit 5." (Pl. 2, W). These sherds are the only rims from the site, in fact from Stewart contexts, with chevron designs on the rim. The design is done in a curious interrupted linear technique, applied on a smooth sur-

face. The linear work is not done by a push and pull method with a pointed tool, but it appears to have been pushed or rocked into the clay with a sharp curved-edged tool with convex surfaces adjacent to the edge. This probably represents the rounded, acute edged corner of a potter's paddle, at the tip beyond the cordwrapping. The edge was pressed or rocked in to make a trough, dragged forward about an eighth of an inch, and rocked in again, producing the interrupted sharply defined line represented on this sherd. The technique resembles, but is not quite identical with, the incising technique found on Iroquois Linear, a primitive incised pottery of the Mohawk and adjacent areas; the design motifs are not those of Iroquois Linear, but resemble those of Oak Hill Corded, a paddle-edged pottery type of the same area.[6] The paste of these abberant Stewart sherds is smoother, less crumbly and sandy, and more evenly mixed than the other sherds from the site. The sherds from this pot, although they cannot be ascribed to any specific origin in a nearby area, are probably trade-sherds from some other upper Susquehanna or central New York area.

There may very well be some parallelism and mutual influence in decorative motifs between the Stewart series and certain Iroquoian pottery sequences, particularly those of the upper Susquehanna. Until we know more of the time depth and changes in the Shenk's Ferry complexes, comparisons between these two areas will be difficult. The horizontal rim incising on the Shenk's Ferry and Stewart series suggests, in motif, not in execution, the incising of the Iroquois Linear type. Chevrons on necks of the Stewart series suggest the incised chevrons on necks of primitive Mohawk and related pottery types, but I believe the Stewart examples are later. The absence of chevrons on Stewart and Shenk's Ferry rims, except for a few of the latest Lancaster County forms influenced by Susquehannock, and the absence of precise correspondence of motifs to any later ceramic types of the Mohawk and Andaste areas, argue against any but the most generalized influence of one area upon the other. The herringbone plats and other motifs of the Stewart necks are horizontal on the pot and their origin from the rim edge-neck edge border is obvious; where similar motifs appear in Owasco and Iroquoian types of the upper Susquehanna and nearby, they show a vertical orientation, with vertical plats on rimless pots as their ancestors. The horizontal bands of oblique gashes on Owasco and related early Iroquois types are more like the bands of the Shenk's Ferry forms than they are like the Stewart series. In the Stewart series they tend to become incorporated into the neck decoration, while in Mohawk and Susquehannock they become absorbed into the rim decoration. It is possible, however, that the horizontal bands of oblique gashes at the top and bottom of the neck, which are early in both Castle Creek and Shenk's Ferry, have a common origin, although the pottery types are not relatives. On the other hand, I am quite sure that the important pottery type, Iroquois Linear, did not borrow any of its distinctive traits from the Shenk's Ferry incised rims, even though they sometimes look much alike. This particular problem is important in the North Branch Valley, however, and will have to be discussed more adequately in another place.

In my own survey work, I have found more Stewart sherds than sherds of any other single kind in the West Branch Valley, the middle Susquehanna, and the

6. William A. Ritchie, **The Chance Horizon, An Early Stage of Mohawk Iroquois Cultural Development,** New York State Museum Circular 29, 1952, pp. 17-18.

lower Juniata. The Stewart ceramic series is as conspicuous and important in this area as the Castle Creek series is in the upper part of the North Branch Valley. My characterization of the Stewart pottery series as given here is, I believe, a fair characterization of pottery from innumerable other sites in the region. Very few excavations have been conducted in this part of Pennsylvania, but two of the other four dug sites include important components of the Stewart complex. Both of these have produced important data which should be described more fully than the brief notice given them here.

The Quiggle Site at Pine Station, Clinton County, is an Andaste site of the earliest contact period which was excavated by a joint expedition of the University Museum, the Rochester Museum, and the Pennsylvania Historical Commission.[7] The final report on this important site was never finished or published because of the untimely death of its preparator, Joseph McFarlane. The collections and notes from this excavation were recently unearthed in Philadelphia by Dr. John Alden Mason, one of the original excavators, and are currently on loan to the Pennsylvania State Museum. My analysis of the material is not complete, nor can I yet answer the central problems posed by the material. Most of the material from the pits is shell-tempered Andaste pottery, in no way related to the Stewart pottery, but apparently made by people who had just entered the West Branch from the upper part of the North Branch Valley. There are a few scraps of European material of the sort found in the earliest contact sites. Mixed in the pits with the Andaste material is a fair quantity of Stewart pottery. This may be accidentally included, may have been shoveled into the pitfill by later Indians from the ground surface where it had lain for years before the Andaste settlement. It is very possible, however, that the Stewart sherds at the Quiggle Site represent the work of captives, of people absorbed into Andaste households from older towns destroyed in the Andaste invasion. This particular problem, that of contact between Andaste and the unrelated earlier peoples of the West Branch Valley, is a major question in the archeology of this area.

The other important site is one at the mouth of Munsee Creek, very thoroughly and carefully excavated by Clarke Kahler of Munsee.[8] Local historians allege this site to be the Indian fort seen and described in ruins by Conrad Weiser in 1737. The site includes at least six components, but two late ceramic complexes are represented by pits, postholes, and a palisade-row. The earlier of these ceramic complexes is Clemson's Island, this being a full prehistoric complex at least a thousand years old, present in all parts of the Susquehanna Valley. The other late component, and probably the one associated with the palisade, is the Stewart complex (identified by Kahler as "Andaste"). One of the Stewart pits at this site had included in the fill a single blue glass bead of the type which was abundant in the Indian trade before 1620. I hope that this site may soon be the subject of a full, well-illustrated report, since it has produced data relevant to several local archeological problems. The glass bead occurrence here suggests that the Stewart complex, like the Shenk's

7. Daniel S. Davidson, The Lock Haven Expedition, **Museum Journal.** Vol. 20, 1929, pp. 307-317. William A. Ritchie, **An Early Historic Andaste Camp Site at Pine, Clinton County, Pennsylvania,** unpublished manuscript in files of the Division of Archeology, Pennsylvania State Museum. The specimens, deposited in the University Museum, are currently on loan to the Pennsylvania State Museum; the field notes, catalog, and other records are in the University Museum, and a microfilm copy is at the Pennsylvania State Museum.

8. Clarke B. Kahler, Indian Exploration Work near Munsee, Pa. **Now and Then,** Vol. 6, 1938, pp. 69-72.

Ferry complex, represents a people who were the indigenes of this part of the Susquehanna until well after 1500 A.D. They were destroyed and the very knowledge of their existence lost when the Five Nations pushed the Andaste out of their North Branch Valley homeland and the Andaste in turn destroyed other peoples during their march to the south and their emergence into the Susquehannocks of our history.

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Plate 1

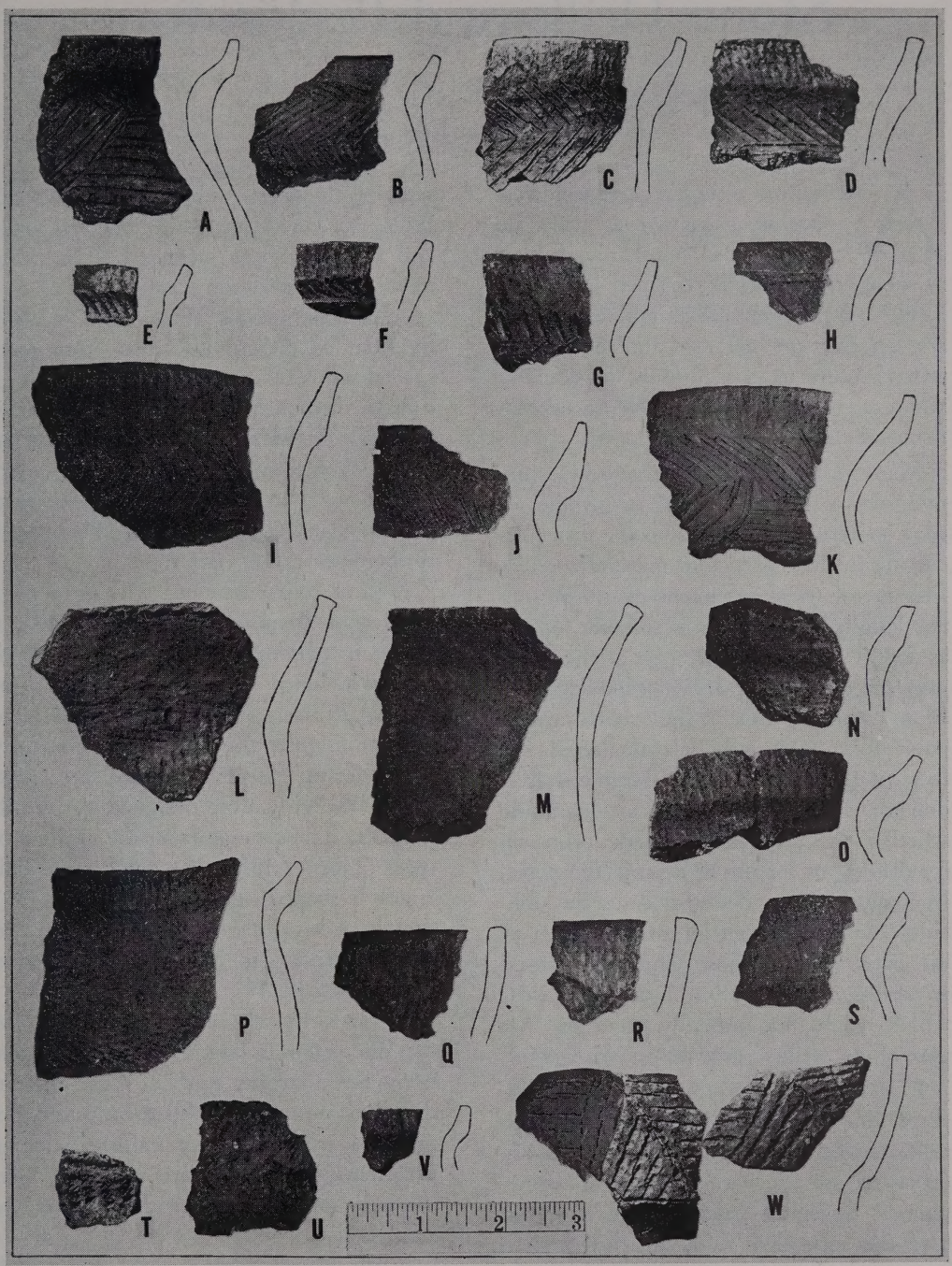

Plate 2

Stone Drills and Perforators

By

Vernon Leslie

Although those archaeological specimens known as drills do not occur so commonly on sites as some other types of chipped stone artifacts, such as arrowpoints and end scrapers, yet they are not rare and lend themselves readily to classification, particularly when a workable system of arrowpoint nomenclature has been developed.

Many drills were either made by "slimming down" the blade of an arrowpoint or were patterned upon arrowpoint forms occurring in their particular cultural context. In some of these specimens nearly the entire length of the blade is suitable for use as a drill, in others, only part of the blade near the tip exhibits drill-like modification. In any case, the base of the original arrowpoint form is usually left unaltered. In fact, in the case of some specimens it is difficult, if not impossible, to determine whether the artifact was made primarily for drilling or for use as a projectile point. In many of these doubtful cases the difficulty can be resolved by an inspection of the blade edges. Those which were used as drills often exhibit noticeable wear which would not normally occur on that part of an artifact used as an arrowpoint.

It is evident from the preceding paragraph that arrowpoint-based drills are susceptible to the same techniques of classification as are the various kinds of arrowpoints.[1] Specimens such as Nos. 1, 4, and 6 of the appended Table are thus known respectively as expanded-base side-notched drills, expanded-base corner-notched drills, and expanded-base stemmed drills. The modifying expression "expanded-base" is necessary in naming these types of drills in order to distinguish them from more specialized drill forms which also occasionally bear arrowpoint features such as notches, etc. A study of Nos. 1-9 in the Plate will readily demonstrate that it is not unreasonable to state that it is possible to have as many types of expanded-base drills as there are arrowpoint types.

It is, of course, obvious why arrowpoint types lent themselves to modification as drills. In particular, the advantages of the various notched and stemmed bases in attaching drills to handles are considerable.

In addition to the drills based on arrowpoint forms, however, there are types which obviously were designed specifically as drills. These range from the spall-based types (Nos. 12-15) to the much more elaborate T-shaped drills (Nos. 24, 25), straight or bar drills, (Nos. 16-19), the side-notched drills (No. 34), and the Y-shaped drills (Nos. 10, 11).

So far as the use of the implements under discussion is concerned, it is evident from even a cursory study of these artifacts that they would be useful for a number of purposes in a primitive culture, such as perforating leather and drilling holes through several substances used by the aboriginal craftsman.

It can be seen from a study of the available literature that drills are not so useful as diagnostic markers as arrowpoints and a few other artifact types. This is possibly due in large part to the comparative scar-

1. See "An Elementary Classification of Chipped Arrowpoints," Vernon Leslie, Pennsylvania Archaeologist, Vol. XXIII, No. 1, May, 1953. The use of Table I of this article for typing arrowpoint-based drills makes a lengthy discussion of their classification unnecessary here.

city of drills with consequent statistical difficulties.

There are, however, certain drill types which do offer help in determining the general period to which a site or component belongs. The following Table will act as a brief guide concerning the diagnostic possibilities of drills in at least part of the Pennsylvania area.[2] [3] [4]

TABLE

Archaic Period

*Expanded-base, stemmed

#Expanded-base, side-notched

#Expanded-base, base retouched for use as as a scraper (No. 29)

*Tapered-base

*Expanded-base, semilozenge

*T-shaped base with ears

#T-shaped base

#Rough spall base

#Straight or bar drill

#Expanded-base

#Expanded rectanguloid base

Intermediate Period

#Expanded-base, side-notched

#Expanded-base, triangular

#Expanded-base, base retouched for use as a scraper

Late Period

#T-shaped base

*Y-shaped base

*Expanded-base, with lateral ears

#Expanded-base, triangular

2. This Table is based only on archaeological data pertaining to central and southern New York and the upper Susquehanna and Delaware valleys in New York and Pennsylvania.

3. Types marked with an asterisk (*) may be considered diagnostic of the period. The mark# indicates known occurrences in the period indicated.

4. It is, of course, obvious that the writer could not possibly hope to cover every possible variant of drill within the range exhibited in the 34 specimens presented in the plate. He has, however, tried to display here all common types found in his own area.

Plate showing various types of drills.

Explanation of Plate

Nos. 1, 2, 3—Expanded-base, side-notched
Nos. 4, 5—Expanded-base, corner-notched
Nos. 6, 7—Expanded-base, stemmed
No. 8—Expanded-base, semilozenge
No. 9—Expanded-base, concave triangular
Nos. 10, 11—Y-shaped bases
Nos. 12, 13, 14, 15—Drills based on rough spalls
Nos. 16, 17, 18—Straight drills
No. 19—Double-pointed straight drill
Nos. 20, 21, 22—Drills with expanded rectanguloid bases
No. 23—Drill with expanded trianguloid base
Nos. 24, 25—T-shaped drills
No. 26—Double-pointed drill with expanded center
Nos. 27, 28—Expanded-base drills
No. 29—Expanded-base drill, base retouched for use as a scraper
No. 30—Drill with tapered base
No. 31—Drill with expanded convex base
No. 32—T-shaped base with ears
No. 33—Expanded-base, lateral ears
No. 34—Side-notched drill

Looking for Artifacts--Part 3

By

Vincent R. Mrozoski

VII—SITE SURVEY

A. The Survey

B. Mapping Techniques

3. The writer is aware that after finding a site, most individuals are anxious to begin excavations on it, but you must remember this: "A site must be surveyed and mapped before this work can be started." You have to know what you are doing—or what you are going to do. In the destruction of a site by interested but by untrained amateurs, the historical and archeological records will be lost with nothing left but a few pits, a handful of pottery, and some artifacts that have no meaning. A prized possession for you, but archeologically of no value to anyone. The "Site Survey Record" is designed to provide information on the number and location of the archeological remains in a given area. It also provides information needed by the archeologist in choosing a site for excavation. A lot of our sites are ruined almost daily by road building, house excavations, industrial locations, and in the process of building dams by government projects. Once under water, a site is lost forever. Sites about to be destroyed should be reported immediately. If nothing can be done—then it is up to you, "the amateur," to provide the necessary information to preserve the historical and archeological value of these sites that are about to be destroyed. It is not what you find, but how you find it, and this can be told only by your *notes*. "An archeological find is only as good as the notes you make and keep." Good notes result from keeping a complete record in detail. Without accurate records and maps, the work of the survey is useless. Remember to let the farmer or the owner of the site know what is going on and what you are doing. Always ask his permission first and he will be very cooperative and may even ask to help. A small group of three to six is always best in making the survey. Larger groups have a tendency to attract the attention of curiosity seekers and also to be a disadvantage by interference with the stock and crops.

In some areas where the streams and rivers are large enough, a boat survey can be made to explore the river banks and islands. The best time to go on such a survey would be in the late fall or early spring when the trees are bare of their leaves. Field glasses can be useful in spotting good camp-sites, rock shelters and caves. Care should be taken when the water is swift by wearing life-jackets for safety.

Before going out, check the equipment which is necessary in making the survey. Your small crew should be responsible for certain items, and teamwork will make a success of your venture.

Survey Equipment:

Knapsack with shoulder straps for carrying equipment. This can be purchased at any army and navy store.

A map of the area.

Paper bags for your specimens.

USGS quadrangle sheets for locating sites.

Pencils for notes and marking paper bags.

Ruler for making sketch maps and marking distance.

Protractor for making maps.

Notebook for notes and containing survey site records, etc.

Compass to determine directions and for map making.

Hand level for rough contour work.

Paint brush for clearing features.

Light whisk broom

Steel tape with readable numbers.

Small shovel for clearing features and emergency excavations.*

Small trowel for exposing features.

Thumb tacks and small drawing board.

Camera**, exposure meter and extra films.

When a site is located, a complete and accurate description should be made on your survey sheet, located on your map, and photographed. The surface should be searched for special features and artifacts. Sampling a site with posthole diggers and steel probes should be discouraged. Such methods often destroy valuable objects.

Site Survey Record:

This form was made up to record your site and is not an official blank. You yourself can add to it or subtract to suit. Please remember to make the record as complete as possible. The recording of your sites will make it identifiable for future excavations.

If in the U.O.V.A.S. area, send a copy to the Survey, Carnegie Museum, Pittsburgh, Pa., and one to the State Anthropologist, State Museum Building, Harrisburg, Pa., keeping one for yourself. If your site does not have a number, write to either of the above addresses for one. Should your site have one, you will be told so—if not, you will be given the next open one.

Site Number—In an emergency, you can number your sites serially in order in which they were found. Here is where the Tri-nominal System comes into use. (July, 1953, issue.) Check with the U.O.V.A.S. if in the Survey, if not, check with our State Anthropologist in Harrisburg.

Site No. ..... Date .....

County ..... Type of Site .....

Township .....

ARCHEOLOGICAL SITE
SURVEY RECORD

Location .....
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Owner and Address .....
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Previous Owners .....
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Present Tenant .....
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Attitude toward Excavation .....
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Description of Site .....
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Area ..... Depth ..... Height .....

Vegetation .....

Nearest Water .....

Type of Soil .....

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* Since excavation is not a part of the survey, you may locate a partially exposed burial or artifact due to erosion, or by plowing. Heavier tools necessary for emergency excavations may be carried in the car if and when needed.

** A lightweight camera is recommended on your survey trips, such as a reflex type that can be focused closer than 30 inches by use of auxiliary lenses, using a 2¼ inch roll film (No. 120). More elaborate cameras recommended for other archeological purposes are at a disadvantage in surveying because of the weight and bulk. One need not go to the expense of purchasing an expensive camera since a secondhand one will serve the purpose.

Previous Excavation .....
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Cultivation .....
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Erosion .....
Buildings on or near Site .....
House Pits .....
Other Features .....
.....
Surface Material Found .....
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.....
Sketch Map (Draw on Back) .....
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By Whom .....
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Remarks .....
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Photos .....
Recorded by .....
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Note: If in the U.O.V.A.S., send a copy of report to Carnegie Museum, Pittsburgh, Pa., and one copy to State Anthropologist, State Museum Building, Harrisburg, Pa. If not in Survey Area, send one copy to Harrisburg.

County

Write in the name of the county in which the site is located.

Township

The name of the township should be recorded in space provided.

Date

Use the date in which your site was first discovered and recorded. This is important because some one else may have had it recorded previously, or may find it later and send in a report. If it wasn't numbered, you will have the distinction of recording it first and later discoverers will be given your site number.

Type of Site

Could be campsite, mound, quarry, river bank, stratified, etc.

Location

If the site cannot be located on the map, give specific directions as to how to get to it. Your county maps give numbers that can be found along the roadside leading to such locations.

Owner and Address

This information is necessary for correspondence with the owner—it also helps in locating the site.

Previous Owners

They may have more information regarding the history of the site, or perhaps a collection of importance.

Present Tenant

This is important for public relations purposes.

Attitude Toward Excavation

If this information is secured during your survey, it will make correspondence unnecessary. Any stipulations should be recorded in detail.

Description of Site

Your entry here could read: "This shell-midden site lies about 15 feet above the creek bed, a large dark area can be seen at the south-end," etc. If a rock shelter, describe briefly as to smoke-blackened roof; if there are any pictograph designs on the walls, etc., give their location.

Area

Your site area can be measured by pacing or with your steel tape. This is where your 100 foot tape comes into use.

Depth

If your survey calls for test excavations, the approximate depth of your site should be recorded here. Depths can also be estimated by stream and river banks, and by road cuts.

Height

Your site may be on several levels or may contain a mound or rock cairn. It will be necessary to note this on your report.

Vegetation

A record of native plants such as various weeds, poison ivy, vines, timber growth, etc., should be noted here.

Nearest Water

Distance and directions to the nearest fresh water available should be recorded here.

Types of Soil

A brief description of this should be: dark loam, clayish, rocky, shell bearing, etc.

Previous Excavations

Any evidence of previous excavations should be recorded. You may ask the tenant or owner for this information; evidence of pits or printed accounts may give this information also. Important discoveries were made on many sites that were previously excavated.

Cultivation

You may inquire as to how long the site has been in cultivation, whether any crops are planted, if in pasture, etc. This will help also in preparing for excavation.

Erosion

Many sites are exposed to erosion by streams or small gully washes after heavy rains, which in time will ruin the site. A note should be made as to the nature and extent of any such condition.

Buildings on or Near Site

This can be drawn on the back of this report together with your sketch map. The nearness of any buildings to the site should be recorded.

House Pits

In test pitting your site, you may run into a house pit—cover and mark it on your map on reverse side of this report.

Other Features

Such other features as quarries, rock shelters, caves, bedrock mortars, pictographs, etc., should be recorded here.

Surface Material Found

Any surface material found during the survey should be recorded—also local private collections made from the site, either by the present tenants or owners, or any other collectors that you may know of. Give their names and addresses if possible. Museums and libraries may also have a collection from the site.

Sketch Map

A sketch map showing the cardinal directions and scale should be drawn on the other side of this report. Be sure to show any buildings or other features on your map.

By Whom

The person making the map should be named here.

Remarks

Any other information not called for on this form can be recorded here.

Photos

Any photographs taken on this site should have the site number recorded on the back and dated. A loan of these would be appreciated in submitting this report.

Recorded by

The full name of the person recording these site data should either be typed or printed.

B. MAPPING TECHNIQUES

Before excavating a site, a map must be made to show what it looked like previ-

ously. A map is a note in the form of a conventionalized picture, and a preservation and presentation of archeological data. There are usually three kinds:

1. Location of a number of different sites.
2. The picture of a single unit.
3. The picture of a feature of one site.

The main purpose of a map should not in any way be clouded by subsidiary material. If necessary, make more than one to represent the site at different levels or at different stages of development. Don't jumble one by trying to include information which actually requires more.

Equipment Necessary for Mapping

The surveying techniques necessary in preparing your map do not require the expensive equipment used by a surveyor. There are many different tools, so use the ones you understand. The skill of the operator also limits the tools to be used; they all have a certain degree of accuracy. Don't rely on your judgment with only a pencil and a ruler. Your drafting equipment should include a drawing board, some sheets of cross section paper, thumb tacks, a supply of sharp drawing pencils, a ruler for horizontal measurements, a protractor, a Brunton pocket transit or a lensatic compass, a 100 foot steel or copper reinforced linen tape for horizontal measurements, a sighting level, (hand level), and a leveling rod for vertical measurements. A carpenter's level and a straight edge can be substituted for the sighting level and a leveling rod. Most of your equipment can be borrowed with the understanding that you will take good care of it. Do not forget a few balls of string or cord. A good compass can be bought at any army and navy surplus store.

Purpose of Measurements

(a) Field Measurements are required to fix three things:

1. A base or datum point.
2. The distance from one point to another.
   a. Horizontally
   b. Vertically
3. The direction from one point to another.
   a. Azimuth
   b. Altitude

(b) Datum or Base Point.

The datum point is the control point, or central reference to which all other points and all directions or measurements refer. Theoretically all points and distances are referred to the base point; practically they are in the main referred to each other, but all can be checked back to the base point. The exact locating of a base point by precise methods permits the perfect goal of terrestrial mapping—plotting of the position of points on the earth's surface with respect to one another. Actual central location on the site itself is not practicable, since subsequent excavation may result in the destruction of the datum location. In this case, the datum point can be established at one corner of the grid system. This is done by driving a metal rod or pipe painted with a bright weatherproof paint into the ground. If there is a rock outcrop on the site, or a solid foundation, an x or cross can be painted within a circle to be used as your base or datum point. You can also save yourself a lot of time and trouble by asking the farmer where his datum point is located. Bridges often have one. The datum point should always be located where it can be seen to guide future workers to the location of the excavated sections. It is a permanent marker and is an absolute necessity. You may wish to open the site at a later date and without it, it would be impossible to locate old trenches and pits. Always give full directions in your field notes for locating the central datum point.

Requirements for Correct Recording

a. Name of the map. Put your site number at the lower right hand side of the map.
b. Name of maker—should always be included on your map at same spot.
c. Date (or inclusive dates) of the making.
d. Date the data were collected. (May be the same as C.)
e. Scale—Without it your map is no good. (Example: 1 inch equals 5 feet, etc.)
f. Reference direction—Conventionally *North*.
g. Location of the datum or base point: should always be marked on all maps.

Suggested Additions to Correct Recording

a. Reference to standard map.
   1. Government topographics. (The best maps available are United States Geological Survey Topographic Quadrangle sheets which may be obtained from the Office of Map Information, U. S. Geological Survey, Washington 25, D. C. An index to these maps should first be obtained. These maps have contour lines indicating the elevation of the land as well as roads, streams, houses and sections which are present on the county highway maps.)
   2. Feature maps should refer to the overall site map.

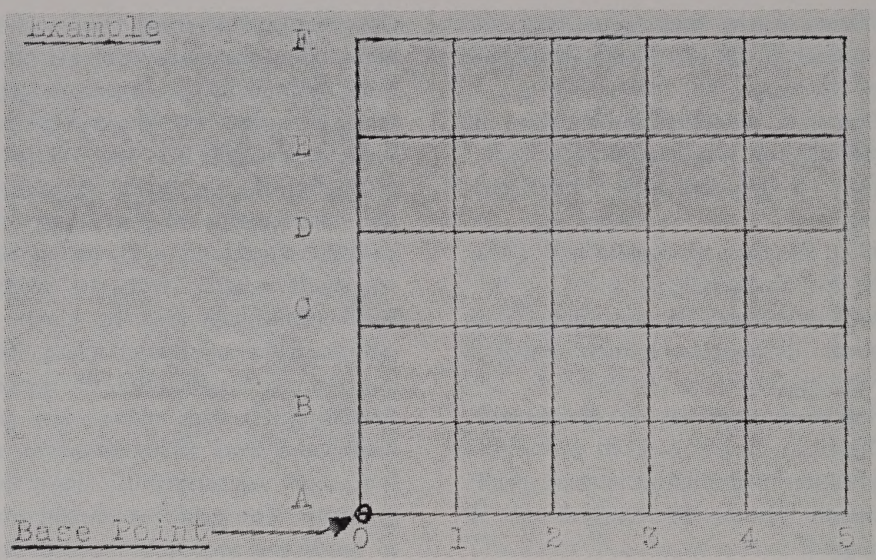
b. Notes or symbols written on the map itself will help explain it.

c. Notes in a notebook to contain relevant (or irrelevant) material.

The Grid System

As an aid in mapping and designating the location of finds, the archeologists mark off a site with two sets of parallel lines, each of the sets intersecting the other at right angles. The interval between the lines is usually five feet. The grid is marked on the site by driving stakes under the intersections of the lines. Pointed wooden stakes, 15 to 18 inches long and one inch square, serve the purpose. A small nail driven into the top of a stake will mark the exact intersection. In laying out the grid, precaution is necessary in stretching the tape along each grid line firmly and level. Measurements must be horizontal measurements, along the slope gradient. The grid line should run north to south and east to west, with reference to either the magnetic or true north, whichever is being used in mapping. Attach your string to the base point, then stretch it from stake to stake over your entire area, making certain it is level with the original attachment at the base point.

Mark a spot in the southwest corner of your graph paper; this is the *base point* on the map. At every ten lines on the horizontal line of the map base point, put a number starting with "0" for the base point, then, 1, 2, 3, etc., consecutively, for as many numbers as you have stakes. For every ten lines on the vertical side, put a letter starting with "A" for the base point, then B, C, D, consecutively, for as many letters as you have stakes. The reference to the ground situation is now clear. For every stake in the ground there is a precise point on your map. Each square on the ground can be described in a note by reference to the map by giving the number and the letter of its southwest corner, as 0-A, 2-E, 4-E, etc.



Locate your base point by compass and mark this information on the map, also making a note of it in your notebook. Next fix the ground height of the datum string by measuring from its attachment on the base point string to the ground. Enter this information on your map and in your notebook. Example: "Height of datum string at 0-A, 6," or whatever it may be.

Each stake should be labeled with its designation by writing on the stake or by a small shipping tag that can be attached to the top with a small nail. Each unit of the grid system is derived from the stake at the southwest corner and this designation is used for the gross location of materials rather than their being located precisely in feet and inches. If the scale is adjusted to the grid interval (1 inch equals 5 feet), the grid lines will fall along the heavy lines on the cross section paper.

I would recommend the purchase of "A Manual of Archaeological Field Methods," a revised edition, by Robert F. Heizer, and edited by the National Press of Millbrae, California. This book is reasonably priced at $2.10 and very valuable to the amateur.

The Society for Pennsylvania Archaeology "Honor Roll"

We are very glad to report that our goal of 500 members will be surpassed by this reading. Our membership is responding to our Membership Drive to get another member. We would like to see your name on this "Honor Roll" of ours at the next printing of our publication. Some of our members are repeating in this issue. Won't you favor our organization in this way? Membership blanks are still being received without any names on the bottom; if you sent in another member, or sponsored one and your name doesn't appear here, please let us know so we can give you the credit. We would also appreciate a change of address card in case you are moving in the future.

(* Indicates more than one member.)

Mrs. Herbert O. Albrecht, Springfield, Pa.
Mr. Kenneth L. Beaudoin, Memphis, Tenn.
Miss Mary E. Brockschlager, Cincinnati, Ohio.
Mr. Donald Brown, Wesleyville, Pa.
Miss Laurel A. Busse, Pittsburgh, Pa.
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Mr. Lawrence M. Conant, Garden City, Long Island, N. Y.
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Mr. R. E. Fleming, New Castle, Pa.

APPLICATION FOR MEMBERSHIP

Date ..... 19 ...

To the Society for Pennsylvania Archaeology:

I hereby request that the Board of Directors of the Society for Pennsylvania Archaeology elect me to Active (Associate, Sustaining, Life) membership in the Society. In order to expedite the transaction, I herewith send the desired fee $ .....

(Signed) .....

Name (Please Print) .....

Address .....

.....

The archaeological quarterly magazine is sent free to all members.

Classes of membership

Associate (under 18 years of age)	$ 1.00
Active	3.00
Active (husband and wife)	4.00
Sustaining	5.00
Institutional	3.00
Life	50.00

All checks or drafts for membership fees or dues should be made payable to the Society for Pennsylvania Archaeology. Mail application and remittance to Mr. Vincent R. Mrozoski, 219 Main Ave., West Aliquippa, Pa.